Project 1 - Part 1

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1. Introduction

Get Start with SimpleScalar.

2. Implementation

Prepare

Environment

- Docker image krlmlr/debian-ssh on Debian 10 (host).
- File `~/simplesim-3v0e.tgz` is downloaded from http://www.simplescalar.com/.
- File `~/benchmarks.tar.gz` is downloaded from http://www.ecs.umass.edu/ece/koren/architecture/Simplescalar/benchmarks.tar.gz.

Script

```
# install
apt-get install tar build-essential

# unzip
tar zxvf simplesim-3v0e.tgz
tar zxvf benchmarks.tar.gz

# path
PATH=$PATH:~/simplesim-3.0
```

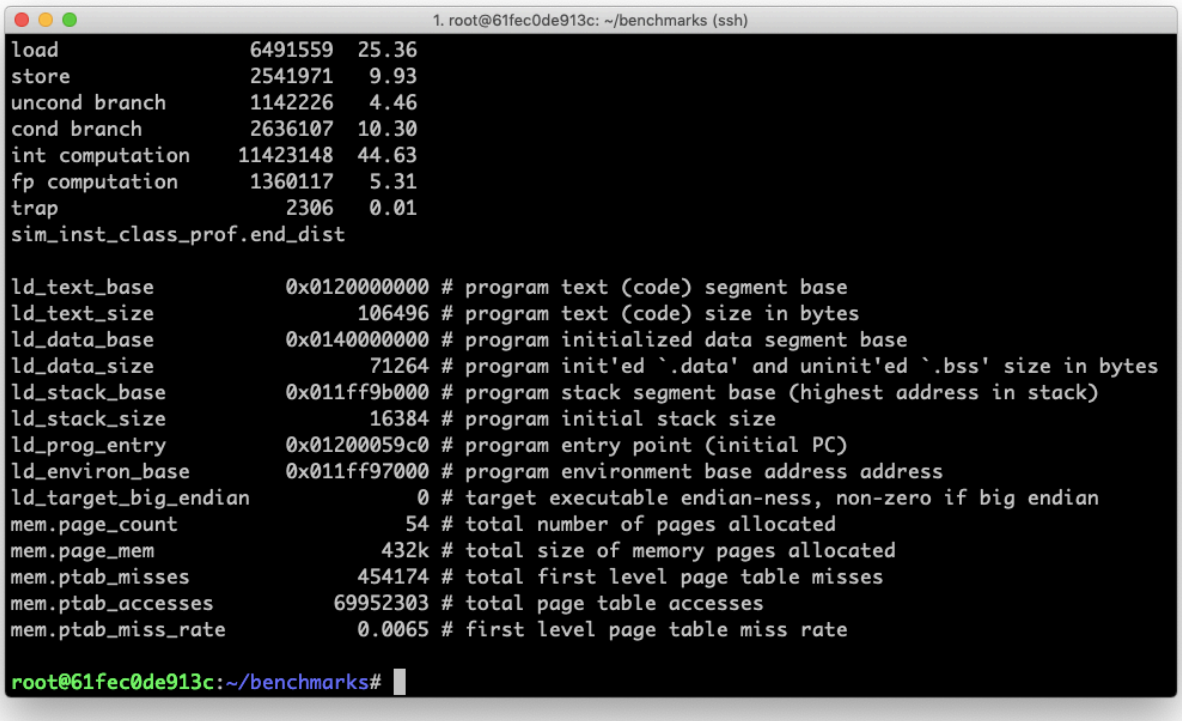
Compile

```
cd ~/simplesim-3.0
make clean
make config-alpha
make
make sim-tests
cd ~
```

Run

```
cd ~/benchmarks
sim-profile -iclass anagram.alpha words < anagram.in > anagram.out
sim-profile -iclass go.alpha 50 9 2stone9.in > 2stone9.out
sim-profile -iclass compress95.alpha < compress95.in > compress95.out
sim-profile -iclass cc1.alpha -O 1stmt.i > 1stmt.s
cd ~
```

3. Result



4. Conclusion

Benchmark	Total # of Instructions	Load %	Store %	Uncond Branch %	Cond Branch %	Integer Computation %	Floating pt Computation %
anagram.alpha	25597435	25.36	9.93	4.46	10.30	44.63	5.31
go.alpha	545811809	30.62	8.17	2.58	10.96	47.64	0.03
compress.alpha	88001	1.54	79.35	0.19	5.67	13.23	0.00
gcc.alpha	337340977	24.67	11.47	4.12	13.33	46.30	0.11

5. Discussion

> 1. Is the benchmark memory intensive or computation intensive?

It seems that `compress.alpha` is memory intensive and others are computation intensive.

> 2. Is the benchmark mainly using integer or floating point computations?

These benchmark are mainly using integer computations.

> 3. What % of the instructions executed are conditional branches? Given this %, how many instructions on average does the processor execute between each pair of conditional branch instructions (do not include the conditional branch instructions)

See the table below:

Benchmark	Total # of Instructions	Cond Branch %	Total # of Cond Branch	Total # of Others	Average # between Cond Branch
anagram.alpha	25597435	10.30	2636107	22961328	8.71
go.alpha	545811809	10.96	59795799	486016010	8.13
compress.alpha	88001	5.67	4993	83008	16.63
gcc.alpha	337340977	13.33	44969464	292371513	6.50